



2017

# Addressing Sleep Deficiencies in Older Adult Residents of Long-Term Care Facilities: Presenting a Flowchart for an Interdisciplinary Approach

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ADDRESSING SLEEP DEFICIENCIES IN OLDER ADULT RESIDENTS OF LONG-TERM CARE  
FACILITIES: PRESENTING A FLOWCHART FOR AN INTERDISCIPLINARY APPROACH

by

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A Scholarly Project

Submitted to the Occupational Therapy Department

of the

University of North Dakota

In partial fulfillment of the requirements

for the degree of

Master of Occupational Therapy

Grand Forks, North Dakota

5/6/2017

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This Scholarly Project Paper, submitted by Peter Owens and Tavin Deru in partial fulfillment of the requirement for the Degree of Master of Occupational Therapy from the University of North Dakota, has been read by the Faculty Advisor under whom the work has been done and is hereby approved.

*Scinda Janssen, Ph.D., OTR/L*

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Signature of Faculty Advisor

*April, 21, 2017*

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Date

## PERMISSION

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Care Facilities: Presenting a Flowchart for an Interdisciplinary Approach  
Department              Occupational Therapy  
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Date

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*April 21, 2017*

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## TABLE OF CONTENTS

LIST OF FIGURES.....	vi
LIST OF TABLES.....	vi
ACKNOWLEDGEMENTS.....	vii
ABSTRACT.....	viii
CHAPTER	
I.    INTRODUCTION.....	1
Statement of the Problem.....	1
Purpose of the Study.....	3
II.   REVIEW OF LITERATURE.....	5
III.  METHOD.....	26
IV.  PRODUCT.....	30
V.   DISCUSSION.....	59
REFERENCES.....	63

## LIST OF FIGURES AND TABLE

TABLE	Page
1. Table 1 .....	15
FIGURES	
1. Figure 1.....	31
2. Figure 2 .....	32-56
3. Figure 3 .....	57

## ACKNOWLEDGMENTS

The authors wish to thank their wives and families their loving support.



## **ABSTRACT**

There is a growing population of older adults, or those people over 65 years old in long term care (LTC) facilities who report sleep deficiencies at a heightened rate, leading to decrease function, cognition, and social participation while increasing mortality, morbidity and the risk of falling (Booth & McMilliam, 2009; Cipolli, Mazzetti, & Plazzi, 2013; Crowley, 2011; Dzierewski et al., 2014; Helbig et al., 2013; Kuck, Pantke, & Flick, 2015). Occupational therapists (OTs) offer non-pharmacological sleep interventions in the long-term care facilities but are not present at many relevant sleeping times. This scholarly project is a flow chart aid to promote an interdisciplinary approach to non-pharmacological sleep interventions incorporating OTs and para professionals, who are available to assist in prescribed sleep interventions. These evidenced based interventions will include reduction of screen time prior to sleep, daily self-care scheduling, modifications to light, temperature, sound, notaria considerations, and participation in meaningful activities. The outcomes measures explored include actigraphy and The Pittsburgh Sleep Quality Index (PSQI)

The Ecology of Human Performance Model (EHP) was used to guide all aspects of the creation of the sleep flow chart. The EHP model was chosen due to its use of a common language among medical professions, structure to organize the components of sleep within LTC facilities, and identification of OT intervention types. The creation of this sleep intervention flow chart included a scoping review of older adult sleep intervention literature. The scoping review

was used because of the paucity of literature that is specific to OT and the interdisciplinary nature of the sleep intervention flow chart.

There are three components to the scholarly project including an intuitive easy to read 24 by 36 inch sleep flow chart to be displayed for quick reference, an infographic that incorporates icons and includes additional information and citations for the use of OTs, and a user guide to the flow chart with additional references and instructions for further explanation to possible interventions.

All components of the final sleep flow chart project were reviewed by 5 individuals with limited knowledge of older adult sleep interventions for comprehension of material, this included a certified nurse assistant and an individual who spoke English as a second language to ensure the language presented would be understood. The sleep flowchart is unique to OT as it identifies the occupation of sleep to be interrelated with basic activities of daily living and the presence or absence of environmental supports at a LTC facility. The flowchart was intended to benefit OT by providing OTs with a simple visual display to assist with educating paraprofessionals on identifying intervention methods to improve their residents' sleep.

## **CHAPTER I**

### **Introduction**

The growing population of older adults, or those over 65, is projected to include more than 83 million people in the United States by 2050, with 27 million of those people requiring long-term care (LTC) assistance (Ortman, Velkoff, & Hogan, 2014). Over 50 percent of older adults report ongoing sleep deficiencies (Mather, 2016). Sleep deficiencies are shown to decrease function, cognition, and social participation while increasing mortality, morbidity, and the risk of falling (Booth & McMilliam, 2009; Cipolli, Mazzetti, & Plazzi, 2013; Crowley, 2011; Dzierewski et al., 2014; Helbig et al., 2013; Kuck, Pantke, & Flick, 2015). These decreases in function, cognition and social participation are not only reductions in an older adult's quality of life, they are also factors that directly contribute to further reductions in sleep, thus creating a bidirectional negative effect for the person and for the older adult care industry (Garms-Homolova, Flick, & Rohnsch, 2010).

Additionally, poor sleep in older adults has financial consequences. The spending on LTC care for older adults exceeded 237.7 billion dollars in 2010, and the number of people receiving care will increase from the 2010 population of 15 million to 27 million in 2050 (Harris-Kojetin, Sengupta, Park-Lee, & Valverde, 2013). The average cost of a fall injury for older adults residing within LTC facilities is 30,000 dollars per incident (CDC, 2015). Pharmaceutical interventions in sleep have been shown to increase risks of falls among older adult users due to

the side effects of sleep-inducing medications (Martin, Ancolie- Iserail, 2008). Therefore, it becomes imperative to explore non-pharmaceutical sleep interventions to reverse this negative trend.

### **Long-Term Care Facilities for Older Adults**

LTC services comprise a range of supports to assist individuals with personal care needs, not merely provisions of medical care. These services can occur at home, in the community, or at a healthcare facility (U.S. Department of Health and Human Services, n.d.). Types of LTC facilities include assisted living programs, retirement communities, and skilled nursing facilities; which are sometimes referred to as nursing homes. (Dağlar, Sabancıoğulları, Pınar, & Kav, 2014). Older adults in LTC facilities have been shown to increasingly rely on LTC staff to provide an environment that is conducive to sleep, thus it becomes necessary to convey prescribed sleep interventions to paraprofessional healthcare workers in order to promote sleep intervention compliance (Ancoli-Israle, Bliwise, & Norgaard, 2011; Ohayon, 2008). To this end, a flowchart with progressive non-pharmaceutical sleep interventions will provide paraprofessionals with easy-to-follow guidelines for improving residents' sleep, including environmental factors and signs that indicate that it may be necessary for further collaboration with an OT or physician.

### **Occupational Therapy Sleep Interventions**

Occupational therapists working within LTC facilities are adept at administering non-pharmaceutical sleep interventions (Leland et al., 2014). However, OTs generally have less contact with LTC residents than other staff. Paraprofessionals, or certified nursing assistants and

personal care aides, maintain 70 to 80 percent of the healthcare worker-older adult interactions in LTC facilities (Paraprofessional Healthcare Institute, 2013). Therefore, it is paramount for OTs within LTC facilities to educate paraprofessionals on the etiology and treatment of sleep deficiencies to promote follow through with sleep intervention plans.

### **Ecology of Human Performance Model**

The Ecology of Human Performance Model (EHP) was developed by occupational therapists (OT) to be compatible with other healthcare disciplines and educators (Dunn, Brown, & McGuigan, 1994). The EHP model was used as a guide throughout this project to promote interdisciplinary comprehension of the final product, a sleep flowchart based on OT principles that leads the implementation of interventions based upon the type of sleep difficulty experienced by residents. Dunn et al. (1994) established that the objective of the EHP model is to increase a client's performance range, or number of tasks a client is able to do based upon his or her abilities and contextual variables. This objective fits well with the proposed sleep interventions as they address contextual factors to restore a client's sleep performance, which in turn stimulates participation in other tasks such as social and physical activities.

### **Occupational Therapy's Role in Non-Pharmaceutical Sleep Interventions**

The EHP model explains the need to account for the influence of context within LTC facilities to understand performance capabilities of individuals. OTs are well suited to address both the underlying physiological components of a person, the psychological demands, and the context under which dysfunction occurs. A sleep intervention flowchart may help to convey the interconnectedness between a client and his or her environment and the evidence-based methods

that will maximize this fit to facilitate the greatest possible level of task performance (Dunn et al., 1994). Within the EHP model there are five identified interventions: establish/restore, alter, adapt, prevent, and create, which were adopted into the American Occupational Therapy Association's (AOTA) framework and allowed for widespread use (AOTA, 2014; Dunn, Brown, & McGuigan, 1994). The performance range, or tasks a person has the ability to achieve, is dependent upon an individual's unique variables within a given context (Dunn, Brown, & McGuigan, 1994). The context can be defined as physical, cultural, temporal, and social factors. The following sections have been organized according to these contextual factors with consideration for the dynamics of sleep within the context of LTC facilities. (Dunn, Brown, & McGuigan, 1994). The proposed evidenced-based interventions will include reduction of screen time prior to sleep, daily self-care scheduling, modifications to light, temperature, sound, nocturia considerations, and participation in meaningful activities. The outcomes measures explored include actigraphy and The Pittsburgh Sleep Quality Index (PSQI).

### **Organization of Subsequent Chapters**

Chapter two contains a review of literature encompassing the etiology of older adult sleep difficulties and evidence-based sleep interventions. Chapter three is focused on the research methodology and how the research was integrated into the sleep flowchart products. Chapter four introduces scaled down versions of the products, including the sleep flowchart, infographic and user manual. The concluding chapter contains product implementation, recommendations for use, limitations, and future research suggestions.

## **Chapter 2**

### **Literature Review**

Sleep deficiencies in older adults, or those over 65 years of age, have been shown to decrease functional abilities, cognition, and social participation while increasing mortality, morbidity and the risk of falling (Booth & McMilliam, 2009; Cipolli, Mazzetti, & Plazzi, 2013; Crowley, 2011; Dzierewski et al., 2014; Helbig et al., 2013; Kuck, Pantke, & Flick, 2015). Over 50% of older adults experience some sort of sleep deficiency (Mather, 2016). Decreases in function, cognition and social participation not only reduce an older adult's quality of life, they directly contribute to further reductions in sleep, creating a bidirectional negative effect for the older adult and for the older adult care industry (Garms-Homolova, Flick, & Rohnsch, 2010). In this literature review, the authors will explore non-pharmaceutical sleep interventions for older adults to promote an interdisciplinary approach to sleep improvement within LTC facilities. The non-pharmaceutical factors that are addressed include: the extent of daily physical activity, social engagement, individual sleep perceptions, frequency of nocturia, napping, lighting, and sound.

Non-pharmaceutical approaches are preferred as first-line treatment options for sleep deficiencies due to the negative side effects that often accompany the implementation of pharmaceutical interventions, such as an increased risk of falls among older adult medication users (Martin, Ancolie- Iserail, 2008). Occupational therapists (OTs) are well poised to deliver non-pharmaceutical sleep interventions (Leland et al., 2014). However, OTs have limited contact time with LTC residents, and are often not present during relevant periods for addressing nocturnal sleep issues. Currently, certified nursing assistants and personal care aides make up

70% to 80% of the total interactions of healthcare workers with older adults in LTC facilities; therefore, it becomes important to effectively educate these workers on recognizing and remedying sleep disturbances (Paraprofessional Healthcare Institute, 2013). Older adults in long-term care (LTC) facilities often lose their ability to independently structure their daily routines (Ancoli-Israle, Bliwise, & Norgaard, 2011; Ohayon, 2008); therefore, it becomes important to effectively educate these workers on recognizing and remedying sleep disturbances.

The growing population of older adults is projected to include more than 83 million people in the United States by 2050, with 27 million of those requiring LTC assistance (Ortman, Velkoff, & Hogan, 2014). The spending on LTC care for older adults exceeded 237.7 billion dollars in 2010, and the number of people receiving care will increase from the 2010 population of 15 million to 27 million in 2050; currently spending will increase proportionally with respect to the population (Harris-Kojetin, Sengupta, Park-Lee, & Valverde, 2013). The LTC services comprise a range of supports to assist individuals with personal care needs, not merely provisions of medical care. These services can occur at home, in the community, or at a facility (U.S. Department of Health and Human Services, n.d.). Types of LTC facilities include assisted living programs, retirement communities, and skilled nursing facilities (sometimes referred to as nursing homes). (Dağlar, Sabancıoğulları, Pınar, & Kay, 2014). To further explore the issue of sleep disturbance in LTC facilities, a model was used as a conceptual framework to enhance understanding.

### **The Ecology of Human Performance Model and Sleep Problems**

The Ecology of Human Performance Model (EHP) was developed by OTs to be compatible with other healthcare disciplines and educators (Dunn, Brown, & McGuigan, 1994).



The EHP model explains the need to view context within elderly LTC facilities to understand performance capabilities of individuals. OTs hold a unique position with the ability to address both the underlying physiological components of a person, the psychological demands, and the context under which dysfunction occurs. The EHP model is particularly useful when therapists are seeking to establish the interconnectedness between a client and his or her environment, and when determining how to maximize this fit to facilitate the greatest possible level of task performance (Dunn et al., 1994). Within the EHP model there are five identified interventions: establish/restore, alter, adapt, prevent, and create, which were adopted into the American Occupational Therapy Association's (AOTA) framework and allowed for widespread use (AOTA, 2014; Dunn et al., 1994). The performance range, or tasks a person has the ability to achieve, is dependent upon the variables of an individual within a given context (Dunn et al., 1994). The context can be defined as physical, cultural, temporal and social. The following sections have been organized to examine sleep within the context of LTC facility. (Dunn et al., 1994).

**Person.** Insomnia is one such sleep deficiency of which approximately five percent of older adults meet the criteria, and another 20% of older adults are diagnosed with sleep apnea (Gooneratne & Vitiello, 2014). The sleep-related disorders of restless legs syndrome (RLS) and obstructive sleep apnea (OSA) are more prevalent among older adults than among their younger counterparts (Crowley, 2011; Martin, Ancoli-Israel, 2008). Another condition that is more prevalent with age, nocturia, occurs when individuals wakes from sleep to void (Ancoli-Israel et al., 2011; Tyagi et al., 2014).

Sleep disorders often co-occur with costly falls, age-related diseases such as renal, cardiovascular, and gastrointestinal conditions (Crowley, 2011; Martin, Ancoli-Israel, 2008). In addition, older adults are at higher risk of developing sleep disorders due to age-related hormonal, respiratory, and psychiatric changes, as well as increased pain frequency (Crowley, 2011; Gooneratne & Vitiello, 2014; Martin, Ancoli-Israel, 2008). Sleep disorders can also alter physiological processes. Van Someren et al. (2015) reported that the duration, timing, and continuity of sleep may affect cellular structure, gene expression, metabolic and hormone regulation, mood, and ability to maintain attention. To remediate some of these disease processes, older adults are commonly prescribed multiple medications, many of which have been shown to negatively affect physiological processes in sleep structure and result in unwanted side-effects including increases in falls (Crowley, 2011; Gooneratne & Vitiello, 2014; Martin, Ancoli-Israel, 2008). Understanding the personal and medical costs of sleep deficiencies becomes crucial when considering the projected rise in the older adult population, their increased risk of acquiring sleep deficiencies, and the far-reaching consequences of leaving sleep issues untreated.

The combination of physiological changes and interconnectedness with depression and anxiety have been found to increase mortality and morbidity in elderly adults at LTC facilities (Crowley, 2011). The correlation between sleep deficiencies and depression or anxiety has been shown, yet it remains unclear as to which precedes the other (Liu, Wheaton, Chapman & Croft, 2013; Zdanys & Steffens, 2015). Inadequate sleep related anxiety alters the body's peripheral functioning, such as heart and lung performance, at the molecular level (Anafi et al., 2013). These aspects related to the person's sensorimotor and psychosocial components can be addressed by interventions that address contextual changes within a LTC facility.

**Temporal context.**

***Daily structure.*** Temporal components that influence one's task performance include the stage of his or her lifespan, the level of dependence or independence, and the timing of tasks throughout the day. Maintaining consistent daily routines has been correlated with measurable increases in sleep by providing predictability in daily structure, thereby calibrating the circadian rhythm to reflect healthy sleep-wake cycles (Figueiro, Lesniak, & Rea, 2011). Older adults that are transitioning into LTC facilities each have unique daily routines that require consideration as potential causes of increased sleep deficiencies and daytime sleepiness (Zisberg, Gur-Yaish, & Shochat, 2011). In a prospective study containing over 240 participants, Martin and Ancoli-Israel (2008) reported higher mortality rates among older adults that self-reported poor sleep quality upon transferring to a post-acute setting. Vincent and Walsh (2012) found that deficits in cognitive and communication abilities, which tend to become more prevalent with age, led to reduced ability to maintain structured routines, resulting in decreased nighttime sleep and increased daytime sleepiness.

***Daytime sleepiness.*** Older adults in LTC facilities were found to spend more time in bed during the day for non-sleep tasks than the younger population (Kuck, et al., 2014), this aggravates existing sleep deficiencies and increases risk of developing sleep problems. Kuck et al. (2014) attributed this increased daytime bed use to a lack of available social activities and decreased frequency of physical mobilization, tasks which would otherwise motivate older adults to participate in activities out of bed. Determining whether daytime sleepiness reflects

inadequate nighttime sleep or a continuation of excessive sleep will help to determine the best course of action for increasing alertness during the daytime (Martin & Ancoli-Israel, 2008).

***Activities of daily living.*** Sleep deficiencies occurring in the day or nighttime impact psychological, cognitive or physical abilities of older adults, which reduces their ability to function independently (Luyster et al., 2007). The American Occupational Therapy Association (AOTA) defines basic activities of daily living (BADLs) as “activities oriented toward taking care of one’s own body” (AOTA, 2014). Inconsistent timing of BADLs was found to be correlated with an increased prevalence of sleep deficits (Zisberg et al., 2010). Older adults in LTC facilities have a range of independence levels and require varying types of assistance to safely complete their BADLs. This fluctuating dependence on staff results in scheduling discrepancies on a daily basis when services are transferred into LTC facilities. Schedule changes for BADLs were shown to reduce sleep quality in older adults, which can lead to reductions in independence with all activities of daily living (ADLs) including toileting, which can lead to issues with nocturia (Martain & Ancoli-Israel, 2008; Zisberg et al., 2010).

***Nocturia.*** Awakening to void occurs more frequently with older adults and often results in poor nighttime sleep. In a study addressing generational differences in nighttime arousal, Ohayon (2008) found that 77.1% of older adults cited nocturia as their primary reason for waking. Nocturia may be an older adult’s primary sleep disruptor, or as Ancoli-Israel et al. (2011) suggested, the need to void will further exacerbate pre-existing sleep disorders due to the physiological arousal from additional trips to the restroom.

### **Physical context.**

***Sounds and temperature.*** While residents in LTC facilities seek high standards of care, including frequent visits from healthcare professionals, this type of environment often has high levels of noise similar to hospital settings (Solet & Barach, 2012). LTC facilities for older adults often involve multiple noise disturbances during nighttime sleeping periods. The Centers for Medicare & Medicaid Services (CMS) outlined regulations for noise in LTC facilities, in which the guideline states “maintenance of comfortable sound level” (DHHS, 2007, CFR 483.15). The problem with this definition is that there is no objective ways to define “comfortable.” A main contributing factor in nighttime noise disturbances occurs when staff members tend to incontinence issues with nearby older adults. The noise level, therefore the disturbance level, is increased when more than one individual occupies a room (Martin & Ancoli-Israel, 2008; Mehra, 2015).

Another CMS regulation regards room temperature, and might interfere with sleep due to the narrow temperature range that is permitted. Okamoto-Mizuno and Tsuzuki (2010) found that colder room temperatures during the winter resulted in improved sleep quality for study participants. CMS regulations permit a temperature range of 71-81 degrees Fahrenheit, which can discount the beneficial effects of maintaining colder nighttime room temperatures (Okamoto-Mizuno, & Tsuzuki, 2010).

***Lighting.*** Environmental components, such as amount, type, and timing of light, play a complex role in sleep within LTC environments. In a systematic review of lighting research, Shikder, Mourshed, and Price (2011) were unable to find OT studies that addressed the contextual component of light. Many of the elderly adults in LTC facilities tend to engage in occupations that are disproportionately indoors where artificial light is inadequate to signal the

body's circadian rhythm (Figueiro et al., 2011; Kuck et al., 2014). The lighting that is often found in LTC facilities consists of indirect artificial lighting for the purpose of reducing glare from bright lighting, which has been attributed to increased risk for falls (Shikder et al., 2011). This reduction in light is compounded by age related changes that reduce the amount of light taken in, such as a reduction in pupil diameter and age related diseases including macular degeneration, cataracts and glaucoma (Shikder, et al., 2011). These factors are problematic because the need for adequate to signal daytime alertness and regulate circadian rhythm.

Lighting is further complicated by the timing of light. The human sleep cycle is ill-equipped to adapt to unnatural light exposure from electronic screens at night time, a time when light intensity usually diminishes. Retinal stimulation from light-emitting electronic devices has been shown to decrease melatonin production and interfere with circadian sleep/wake rhythm (Shochat, 2012). Further sleep disruption ensues if one is viewing exciting or stressful content in the hours leading up to sleep (Shochat, 2012). Older adults waking to void requiring light to facilitate safe transfers results in similar heightened alertness and reductions in sleep that will impact subsequent daily activities (Booth, & McMillian, 2009).

### **Social context.**

***Social and physical activities.*** Living in a LTC facility is commonly the result of decreases in independence levels, consequently reductions in physical activity and social contact occur (Kuck et al., 2014). The circadian rhythm that usually signals a body for nocturnal sleep becomes ineffective when physical and social activities are not present during the day (Kuck et al., 2014). In a study utilizing large amounts of resources including 10 hours a week of physical mobilization with pneumatic fitness machines and 10 hours a week of socialization including

over 100 individualized intervention types, Kuck et al. (2014) found decreases in sleep deficits. Although relevant in showing the relationship between physical activity and sleep, many LTC facilities cannot afford to provide these resources on an ongoing basis (Kuck et al., 2014). Beyond financial resources, agitation from lack of sleep and deficits in cognition and communication lead to reductions in social interactions (Garms-Homolova et al., 2010).

***Cognitive decline.*** Older adults experiencing inadequate nighttime sleep have been found to experience increased rates of cognitive decline due to reduced memory consolidation subsequently leading to decreased performance in activities requiring memory recall used in ADL task performance (Cipolli, Mazzetti, & Plazzi, 2012). Garms-Homolova et al. (2010) found significant associations between sleep disturbance, impaired communication, cognition, and increased levels of conflict. The conflict and agitation caused irregularity in the frequency of the occupational therapy services provided to the 2577 participants of the study. This irregularity of services contributed to the sleep, cognition, and agitation problems, which further reduced OT participation. In a related study, Seelye et al. (2015) found that one night of poor sleep did not have a significant impact on cognitive function the following day. However, poor sleep from the week and month prior demonstrated a significant decrease in working memory, which plays a primary role in decision making and problem solving (Seelye et al., 2015). Therefore, building inadequacies in sleep can contribute to and exacerbate impaired working memory, communication, social participation, and decision making leading to further reductions in sleep and social seclusion. Sleep deficiencies contribute in a cyclical nature to impairments in cognition and participation levels, putting older adults at risk for acquiring depression and anxiety (Zdanys & Steffens, 2015).

### **Cultural context.**

**Napping.** Daytime sleeping, or napping, can help to offset the effects of inadequate sleep (Hannah et al., 2012); however, without addressing clients' cultural significance to napping, and the underlying issues that impact daily structure, naps may in fact be detrimental. In addressing sleep consistency within inpatient facilities, Patel et al. (2014) found that napping in older adults correlated with an increase of diabetes and mortality. Dzierzewski et al. (2014) postulated that older adults often experience decreases in nighttime sleep efficiency, an occurrence that elevates the need for daytime sleep. The authors further reported decreased global cognitive functioning in older adults with underlying health disorders who napped during a 6-month period following inpatient rehabilitation. The severity of the consequences of napping include costly falls needing further attention within the LTC context.

### **Older Adult Falls**

The combined environmental consequences of poor sleep have widespread effects on psychological, cognitive and physical abilities of elderly individuals which result in higher incidences of falls. Siracuse et al. (2012) found an increase in the number of falls in the elderly populations that were experiencing difficulties initiating sleep and staying asleep. In a study assessing the relationship between sleep disorders and falls in the elderly population, Helbig et al. (2013) reported that older adults that had experienced a fall had more difficulty falling asleep and staying asleep or reported daytime sleepiness than those who had not fallen. Participants who reported difficulties staying asleep were found to have significantly more falls (Helbig et al., 2013). In 2015, the Centers for Disease Control reported that over 700,000 older adults were hospitalized due to falls in a one-year period. The average cost per fall injury was \$35,000,



which increases concurrently with the increasing age of the patient (CDC, 2015). The strong relationship between falls and sleep combined with the large costs associated with falling reveal the need for ways to measure and identify sleep in older adults at LTC facilities.

### **Sleep Evaluations**

The research reveals that assessing older adults' sleep quality should be included in their health assessment and treatment plans. With the prevalence of sleep deficiencies in the growing older adult population, health professionals of LTC facilities need to be able to evaluate sleep with meaningful objective and subjective measurements. Two effective sleep measurement instruments include actigraphy and the Pittsburgh Sleep Quality Index (PSQI).

Actigraphy is an objective measurement instrument that is most commonly worn on the wrist and records movements multiple times per second (Littner et al., 2003). Data derived from actigraphy instruments can be downloaded to computer programs that interpret and organize the data sets to include sleep onset (when sleep is achieved), sleep latency (how long it takes to achieve sleep), sleep duration (the total time in a state of sleep), and sleep disturbances represented by sleep wake cycles throughout sleep (Littner et al., 2003). Actigraphy instruments can also be used to measure daytime movement, which becomes important when considering the impact of activity levels and daytime sleep.

Subjective measurements, such as the PSQI, record one's self-perception of sleep quality. The measurements are taken as self-report or caregiver/observer reports. The subjective sleep measurements are concerned with a person's overall perception of how effective the sleep process was based on the person's recollection of objective factors (Spira et al., 2011).

Table 1 <i>Sleep measurements</i>				
Sleep Assessment	Description	Time Frame Measured	Measures	Psychometric Properties
Actigraphy (Littner et al., 2003)	Objective measure of sleep wake cycle Electronic unit worn commonly on wrist of dominate hand Unit takes multiple measurements per minute	Previous night's sleep (can be worn for nights and days in succession)	Measures movement of arm the unit is worn on.	Approval from the Board of Directors of the American Academy of Sleep Medicine
Pittsburgh Sleep Quality Index (PSQI) (Spira et al., 2011)	Competition time is 5-10 minutes 19 self-rated Likert scale items that relate to the seven sleep measurements  A separate 5 questions available for bed partner's perception but not included in the score	1 month	7 sleep measurements: Subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbances, use of sleeping medication, daytime dysfunction	Found reliable with older adult population With strong correlations to identified sleep diagnoses, and functional outcomes related to sleep.

## Person

***Mindfulness.*** Mindfulness interventions address anxiety and depression through an acceptance of thoughts and emotions that are happening in the present time (Black, O'Reilly, Olmstead, Breen, & Irwin 2015). Black et al. (2015) describe depression as focusing on negative past events, and anxiety focusing on the possibility of negative future events. The mindfulness

concept is generally taught in classes with no certification specific to a medical discipline required. Mindfulness concepts can be interwoven into occupations which allows for the multiple disciplines including occupational therapists to lead and reinforce the principles (Black et al., 2015). Black et al. (2015) saw improved sleep and sleep-related daytime impairments of anxiety, depression and fatigue with mindfulness interventions for the older adult population.

***Cognitive behavior therapy for insomnia.*** Another intervention that focuses on the perception of events is cognitive behavior therapy for insomnia (CBT-I) are interventions that target individuals with insomnia and require the skill of an OT. The interventions are directed at establishing new perceptions of sleep for an individual and restoring behavioral components involved in sleep preparation (Leland et al., 2014). Ellis, Cushing, and Germain (2015) sought to determine whether a single 60 to 70-minute CBT-I, with the distribution of a self-help pamphlet, was efficacious for acute insomnia. Post-intervention data indicated that providing a single session of CBT-I and distribution of an educational pamphlet may decrease occurrence and symptomatology of acute insomnia; thus decreasing the risk of developing chronic insomnia.

### **Temporal context.**

***Daily structure.*** Policies from LCT facilities that alter daily structure will influence daytime and nocturnal sleep (Zisberg et al., 2011). Zisberg et al. (2011) found that older adults in LTC facilities had an easier time getting to sleep, tended to sleep longer, and reported increased satisfaction with their sleep when there was consistent scheduling for BADL task completion. LTC facilities often follow daily routines with meals and activities that are attributed to decreases in perceived sleep quality (Zisberg et al., 2011). Understanding how the facility's routines contribute to or detract from sleep efficiency is important to consider when an older

adult is transferring into a LTC facility (Zisberg et al., 2011). Transitions into inpatient facilities must take into consideration prior routines for an understanding of how sleep contributes to sleep and daily function. For healthy adults, Slack (2010), recommends changing routines by one hour a day until the desired match has been established. The emphasis should be placed on basic ADLs, such as brushing teeth and bathing as these have been shown to have a direct impact on sleep deficiencies (Zisberg et al., 2011). Knowledge of a transitional time frame and the identification of basic ADL timing will result in residents who will function at their maximum independence, decision making, and cognitive capacity with respect to sleep (Zdanys & Steffens, 2015; Zisberg et al., 2011).

**Nocturia.** Nocturia is the most common reason for nighttime waking in older adults; however, altering sleep preparation policies at LTC facilities have the potential to reduce this sleep disturbance (Booth & McMillian, 2009). These policies should include bladder retraining, nighttime fluid restriction, and fluid redistribution (Booth & McMillian, 2009). Bladder retraining refers to the idea that the body receives cues from nightly routines that prompt an older adult to wake and void (Wagg et al., 2005). To address these behavioral cues, Hashin and Abrams (2008) recommend nocturia reductions with nighttime fluid intake regulation, including assessing and restricting alcohol, caffeine, and water intake prior to bed. Diuretic medications should also be assessed for proper timing so that much of the voiding takes place during the day. Fluid redistribution, or allowing fluid to enter the bloodstream throughout the day, results in timely daytime voiding. Fluid redistribution can be achieved using lower extremity compression garments, leg elevation, and daytime napping (Booth & McMillian, 2009).

***ADLs.*** Maintaining a routine for activities of daily living has been shown to improve self-perceived and self-reported sleep for elderly individuals in LTC facilities (Zisberg et al., 2010). Leland et al. (2016) found that the sleep quality of community-dwelling older adults increased with regularly occurring BADLs, pointing to the need for highly structured LTC facilities for older adults. Many older adults in LTC facilities lack the ability to identify implement strategies related to sleep, BADL timing is one way LTC facilities can assist older adults with overall sleep quality (Herrmann & Flick, 2011). Other components that LTC facilities can address include physical elements such as sound, temperature, and lighting.

**Physical context.**

***Temperature.*** The influence that temperature exerts upon sleep is a factor that often receives little attention; however, Liao (2002) reported that decreasing the core temperature of one's body and increasing distal skin temperatures may improve sleep quality. Therefore, to achieve optimal sleep, one's environment should be cool while simultaneously ensuring that hands and feet remain warm. In a systematic review, researchers analyzed studies in which body temperatures were manipulated during the evening in elderly populations. Throughout three crossover studies, Liao (2002) found evening baths to increase slow wave sleep and reduce sleep disruptions. Temperature modifications generally require little effort and should be considered for improving one's sleep quality.

***Lighting.*** Proper lighting schemes also can provide benefits to all residents sleep quality. Short wave light exposure during the day has been shown to increase the melatonin suppression needed for initiating nocturnal sleep in the evening, and there are various methods of achieving this short-wave light exposure (Figueiro, 2011). In a systematic review, Shikder et al. (2011)

found dawn simulators effective in producing circadian rhythm responses and increasing daytime wakefulness and facilitating sleep in older adults. Figueiro et al. (2011) sought to explore the efficacy and viability of using moderate-intensity lighting for longer duration (8-10 hours) versus the conventional method of using ultra bright light for shorter durations (1-2 hours) seen in dawn simulators. Post-intervention data revealed significant improvements in sleep quality, total sleep time, and sleep efficiency after being analyzed. Additionally, depression and agitation scores were significantly reduced following the intervention. Attempting to utilize shortwave lights on an individual basis, Royer et al. (2009) utilized Philips Color Kinetics Colorgraze Powercore lighting within goggles worn by older adults for a one hour duration with no statistically significant results on self-perceived sleep satisfaction. Researchers have asserted that installing long duration, moderate intensity lighting will adequately address older adult needs within LTC facilities and help to synchronize their circadian rhythms.

The nighttime use of electronic devices, such as televisions, smart phones, tablets, and computers results in retinal stimulation and circadian disruption, which takes a toll on sleep quality, quantity, and timing (Shochat, 2012). This is of concern because of the increases in frequency with electronic device use. Shochat (2012) noted that the increased availability of devices that are present in individual's rooms resulted in escalated device use, which is problematic for those residing in LTC facilities due to the ordinary placement of televisions within residents' rooms. However, this aspect of the study was focused upon adolescents and young adults who may not possess the intrinsic self-regulation needed to self-impose restriction of device use (Shochat, 2012). To combat the negative effects of untimely retinal stimulation,

restriction of electronic device use in the hours leading up to bedtime and other sleep enhancing tools may be suggested to older adults who are experiencing difficulties with sleep

Advancements in technology have led to the development of specialized equipment that manipulates light and sound to improve sleep quality. Audio-Visual Stimulation (AVS) devices use specific light and sound patterns to promote low frequency brainwave activity and decrease high frequency brain activity, thus promoting relaxation and sleep (Tang, Vitiello, Perlis, Mao, & Riegel, 2014). AVS users are to schedule approximately 15 - 30 minutes, depending on the device, to wear the device's goggles and earphones while lying in bed. AVS devices are relatively inexpensive and do not require a prescription for purchase, which improves accessibility for individuals who wish to avoid the side effects of sleep-inducing pharmacological preparations.

***Sleeping tools.*** Once older adults attempt to engage in the occupation of sleep, adaptations in light, including the sleep tools like eye masks worn to reduce light, can be considered; however, no study has found that donning an eye mask is effective on its own (Yazdamnik et al., 2015). A combination approach to non-pharmaceutical sleep tools has been recorded within the setting of the Intensive Care Unit (ICU) (Yazdamnik et al., 2015). The ICU may not be specific to the older adult population, but the studies are relevant as the ICU includes a combination of sounds, healthcare worker disturbances, and medication use all of which are variables seen on a smaller scale at LTC facilities (Crowley, 2011). Yazdannik et al. (2015) and Martin and Ancoli-Israel (2008) both used subjective measurements to capture how earplugs and eye masks affected sleep; both studies failed to show significant results within an ICU setting. In direct contrast, Fung (2010) found that using earplugs alone improved objective measurements

of REM sleep with increased melatonin excretion. In a similar ICU sleep study using objective measures, Hu, Jiang, Hegadoren, and Zhang (2015) found eye masks, earplugs, and music to show statistically significant increases in sleep. Even though the evidence appears to be conflicting, data may have been misrepresented due to the differences in sleep measurement. The combinations of eye masks, earplugs and music can be used to promote sleep in an environment where the context shows high levels of visual and auditory distractions.

***Music therapy.*** Music alone can be therapeutic to the sleep process. Music therapy involves playing sedative music that can range from client identified, caregiver identified, or classical music for 20 to 45 minutes in duration (Niet, Tiemens, Lendemeijer, & Hutschemakers, 2009). Sedative music should be played at a consistent time every day, which can range from late afternoon, evening, or bedtime. Sedative music improves sleep by reducing anxiety and balancing hormone levels. Music therapy does not require the investment of specialized training and can be used in conjunction with other sleep hygiene therapies (Niet, et al., 2009).

***Social context.*** Tasks such as ADLs can contribute to reductions in sleep deficiencies through consistency within the routine, but the physical movement and social engagement also play a role in overall sleep enhancement. Commonly, residing in LTC facilities results in a reduction of physical and social activities as in-bed day time non sleep tasks increase (Kuck et al., 2014). Policies and procedures that promote group activities involving cognitive skills, fine motor skills, and creative skills with group discussion have been shown to enhance sleep (Kuck et al., 2014). Group social activities can be combined with physical exercises including warm up activities, standing, walking balance, resistance exercises, and cool down activities (Kuck et al.,



2014). Policies that alter the environment to allow for greater social and physical activities are examples of effective sleep interventions that address the context of an older adult.

Garms-Homolova et al. (2010) identified the cyclical nature of irregular participation in physical, social and sleep activities connecting with reduced levels of cognition. Because the relationship is interrelated and some cognitive decline is related to the ageing process, interventions specific to sleep will contribute to more regularity in physical and social participation breaking the cyclical nature of the intertwined deficits. Sleep interventions may also happen during the day with benefits to some cognitive components and social interactions (Hannah et al., 2012; Korman et al., 2015).

### **Cultural context.**

***Napping.*** Napping is a complex issue because it is interrelated with culture, and it can lead to increased or decreased activity levels, cognition, and mortality, depending on an individual's specific condition. In addressing sleep consistency, Patel et al. (2014) found that napping in older adults correlated with increased rates of diabetes and mortality. Patel et al. (2014) postulated that the strong association between napping and obesity may reflect irregular sleep-wake hours and sporadic mealtimes, which are often signs of an unregulated lifestyle and not a negative reflection on naps. Further complicating the issue of napping, Dzierzewski et al. (2014) reported that napping was correlated with increased rates of mortality, which they attributed to the possibility that excessive napping may be a symptom of poor health and not necessarily the cause of mortality.

Napping has additional cultural considerations that depend upon cultural acceptance of naps, duration, and frequency of napping. In a study conducted in the United Kingdom, where naps are more prominent throughout the lifespan, napping for less than 60-minutes or more than 90-minutes were found to stave off the effects of cognitive decline (Hannah et al., 2012). In a study conducted in the United States, where napping is less prominent, 60 and 90-minute naps were found to decrease the time needed to learn new motor tasks, with slower rates following 90-minute naps (Korman et al., 2015). Interestingly, these naps had no effect on the duration of nighttime sleep (Korman et al., 2015). LTC facilities first need to evaluate an individual's health, culture, and prior daily structure to find an acceptable fit when designing his or her daily activity schedule.

### **Falls Used Indirectly as an Outcome Measure for Sleep Interventions**

The combined consequences of shortened sleep duration, interrupted sleep, and poor self-identified sleep quality have widespread effects on psychological, cognitive and physical abilities of elderly individuals (Garms-Homolova et al., 2010). Use of pharmaceutical interventions in sleep increases the risks of falls in among older adult users (Martin, Ancolie- Iserail, 2008). Because falls are associated with personal costs, societal costs, and higher mortality rates, implementing nonpharmacological interventions to improve sleep will reveal the nature of the effectiveness through provide relevant reductions necessary for the sustainability of the older adult LTC facility industry (Helbig et al., 2013; Moorman, 2012; Siracuse et al., 2012).

### **Discussion**

As the number of older adults increases, the rate of age-related sleep deficiencies will also increase. For the older adult population, this often results in decreased cognition and

independence levels and increased falls, depression, and anxiety. Older adults in LTC facilities have reduced dependence levels and require assistance for daily tasks; the nightly task of sleep should also include assistance from an interdisciplinary team. Non-pharmaceutical sleep interventions at LTC facilities will have far reaching effects on daily independence levels, anxiety, depression, and social participation.

A variety of sleep conditions are interrelated and are affected by the contexts found within LTC facilities, such as the timing and structure of daily activities. LTC facilities should focus their scheduling efforts on the timing of daily structure for BADLs as this was found to have the strongest association with increased sleep (Figueiro et al., 2011). Older adults who recently transferred into LTC facilities require special consideration regarding their previous routines (Vincent & Walsh, 2012; Zissberg et al., 2007). Once transitional routines are accounted for, further individual factors must be considered regarding overall health and cultural perceptions of sleep. Some cultural beliefs and perceptions should be addressed by specific members of the healthcare team; mindfulness and CBT-I are interventions that focus on perceptions of sleep and can help reduce anxiety along with depression. To accommodate the time considerations and the specialization of the interventions these techniques would be best administered by an OT.

Healthcare professionals may wish to consider providing an environment that supports daytime sleep. These naps should take into consideration cultural differences about how an individual perceives a nap, the tolerance to nap length, and the effects on nocturnal sleeping to improve subjective sleepiness, motor skill acquisition, cognitive performance, accuracy, and reduced fatigue (Campbell et al. 2011; Korman et al., 2015; Milner & Cote, 2008). Napping was

also found to be an effective intervention for reducing the occurrence of nocturia, which was identified as the most common sleep complaint among older adults and one that exacerbates co-occurring sleep disorders (Ancoli-Israle et al., 2011; Ohayon, 2008). Reductions in nocturia will also lessen the environmental components of nighttime sounds related to staff interventions concerning incontinence and room sharing (Martin & Ancoli-Israel, 2008; Mehra, 2015; Solet & Barach, 2012). To alter an individual's environment by reducing noise, a combination of sleep tools including eye masks, ear plugs, and relaxing music should be considered (Hu, 2015). LTC context considerations need to look at interventions that create light and temperature environments, which allow for all older adults to benefit from scheduling changes that reduce sleep deficiencies.

Decreases in cognition, and communication lead to reductions in social and physical interactions, important to cueing the body's circadian rhythm to sleep and sleep deficits (Garms-Homolova et al., 2010). Sleep deficits contribute to further decreases in cognition and communication (Garms-Homolova et al., 2010). This cycle of distraction can lead to agitation and further anxiety, depression, isolation, falls, and sleep deficiencies within LTC facilities. Focusing interventions on schedule adherence and contextual supports through an interdisciplinary approach can break this negative cycle.

The creation of an easy to use flow chart to be used by therapists and aids alike is an effective way to build an interdisciplinary approach to the systemic nature of sleep deficiencies in LTC facilities. Flowcharts can be hung in highly visible areas and convey simple sequential instructions to facilitate sleep interventions. Though OTs address sleep directly the flowchart will allow other professions like healthcare aids, present in resident's daily and nightly lives, to

play a role in evidenced based sleep promotion. For further explanation of simplified interventions, a user manual and OT specific infographic can be supplied. Approaching sleep with an interdisciplinary team including visual reminders will ensure that the task of sleep has the needed assistance levels appropriate for residents.

## **Summary**

The far-reaching negative consequences of sleep deficiencies for older adults in LTC facilities result in a reduction of their ability to safely complete daily tasks, causing an unregulated positive feedback cycle that leads to further sleep reductions. To effectively treat sleep deficiencies, it is necessary for an interdisciplinary team approach guided by the EHP model to examine scheduling and daily routine factors that influence sleep quality. Creating a culture within a LTC facility that recognizes the need for sleep in older adults will result in significant spending reductions due to reduced falls, increases in physical and social participation, and decreased anxiety and depression through increased engagement in tasks. The results of this sleep sensitive culture can be measured by decreases in falls and related expenses. The following chapter will explain relationship of the flowchart to the literature and explain the methodology in obtaining the evidence. The sleep flowchart will be provided with an accompanying infographic and user manual, followed by the limitations with recommendations by the authors.

## Chapter III

### Methodology

The scholarly product, *Addressing Sleep Deficiencies in Older Adult Residents of Long-Term Care Facilities: Presenting a Flowchart for an Interdisciplinary Approach*, addressed the correlation between increases in functional performance and improvements in the task of sleep. This was accomplished by identifying the positive outcomes associated with sleep interventions and by recognizing the bidirectional relationship of sleep and task performance. The flowchart will be accompanied by two supplemental materials: a user manual, which contains additional information intended for paraprofessionals; and an information graphic organized by intervention type to assist OTs with guiding an interdisciplinary approach to sleep.

The flowchart was created with consideration for the principles of adult learning, and supplies a means for OTs to easily communicate sleep improvement interventions to paraprofessionals. The user manual provides a guide to explain the use of the flowchart and furnishes supplementary information regarding the link between the interventions and the type of sleep deficiency being experienced. The flowchart is a 24-inch by 36-inch poster with graphics, text, and arrows to guide the selection and implementation of non-pharmaceutical sleep interventions, to be displayed within the paraprofessionals working area.

**Creation of sleep flow chart materials.** Since the majority of sleep occurs at the late night through early morning hours, it was necessary to establish an interdisciplinary team approach to implement sleep interventions at all hours. Therefore, the creation of an easy-to-use flowchart for OTs and aids alike has been created. Although OTs will oversee sleep assessments

and interventions, the flowchart will allow other staff members, such as healthcare aids, to play a role in implementing evidenced-based sleep promotion interventions. It was determined that further clarification of the flowchart, with simplified descriptions of the interventions, would promote comprehension and use of the flowchart, thus a user manual was created.

The user manual provides additional information, including definitions of terms used, common examples, and cultural considerations when implementing sleep interventions. Both the sleep flow chart and user manual have a Flesch–Kincaid readability level of tenth grade or below. A tenth-grade readability level was determined to be appropriate as certified nurse aides must have a high school degree, and the generally accepted standard is to provide materials with a reading level two years under that of a person’s last educational grade level (Bastable, Gramet, Jacobs, & Sopczyk, 2011).

To ensure that interventions were accurately communicated in a common language, five reviewers who had no prior education with sleep interventions reviewed the sleep flowchart and user manual and provided feedback to improve comprehension. The reviewers included a certified nurse and a person who spoke and read English as a second language. Feedback from the reviewers was taken into consideration when the final versions of the flowchart and user manual were reviewed for clarity. The authors further considered the need for an in-depth elaboration on the proposed sleep interventions written with language and concepts common to OTs. To this end, a supplementary infographic with icons corresponding with the interdisciplinary flowchart and user manual was created for use among OT professionals to assist them with guiding the sleep intervention process.

**Review of literature.** A systematic search of literature was conducted in which a scarcity of recent evidence for OT sleep interventions was found specific to older adults residing in LTC facilities. The literature search was expanded to include research originating from multiple disciplines. This search type coincides with the search used by Leland et al., (2014) when they performed a scoping review of older adult sleep intervention literature, in which they included literature from other disciplines due to the paucity of OT-specific literature. The terminology used in the search for the current project included older adult, long-term care facility, sleep, sleep environment, sleep interventions, occupational therapy, non-pharmacological, and sleep assessments. The databases searched included Google Scholar, PubMed, ScienceDirect, OTseeker, and Cochrane. Research was considered relevant if it was published within the last 15 years, although further consideration was given for research published within the previous 5 years. Exceptions were made at the discretion and consensus of the researchers based upon the originality of the research. Research findings were included in the literature review if they included adults over 65, non-pharmaceutical sleep interventions, LTC facilities, and written in or translated into English. Research was excluded if it focused on diagnosis, gender, community-based, or was specific to pharmacological interventions.

The research that met inclusion criteria for use with the literature review was organized by the EHP model's representation of contextual factors that influence one's functioning. Inclusion criteria was adults over 65 years who were residing within a LTC facility and displaying signs and symptoms of sleep deficits. Dunn et al. (1994) defined context as the physical, cultural, temporal and social environments of an individual. For the current project,



context was broken down to reflect factors that are commonly found within LTC facilities, factors which were subsequently used to organize the structure of the paper. Within the EHP model there are five identified intervention types: establish/restore, alter, adapt, prevent, and create. The flowchart and supporting materials have been organized into these intervention types to reflect the use of the model throughout the process of development and to organize the product into the intervention types that coincide with the AOTA Framework (AOTA, 2014).

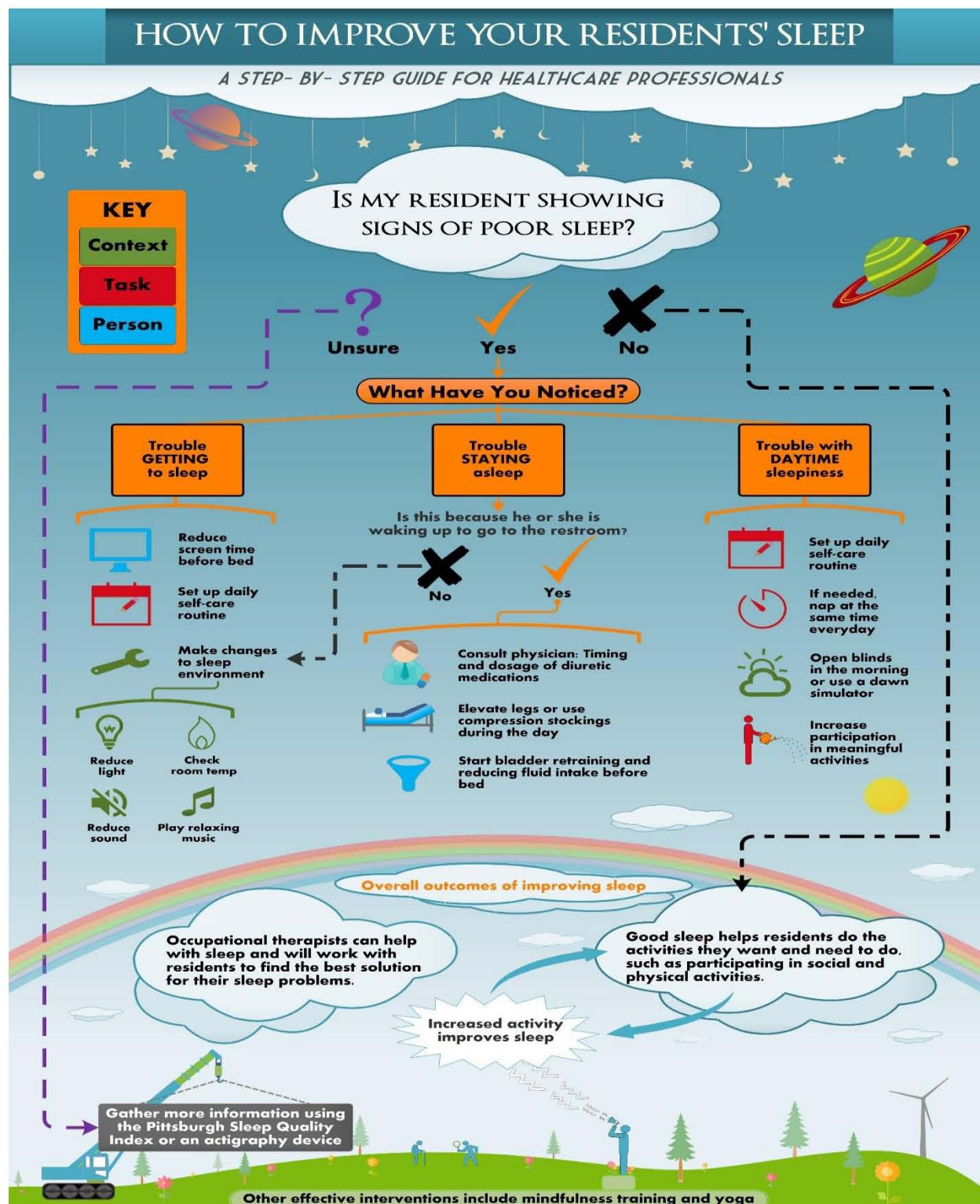
**Communicating relevant evidence.** The scoping review of older adult sleep intervention literature, including that from non OT disciplines, ensured both clarity and completeness to the evidence used in the current project. Including relevant disciplines other than OT reflected the interdisciplinary approach of this scholarly project. The authors promoted communication amongst the interdisciplinary treatment teams that are generally found within LTC facilities through utilizing various levels of readability specific to that of the education level of the intended reader, ensuring consistency with icons throughout the products, and reviewing these materials for clarity with individuals of various backgrounds. Approaching sleep improvement at LTC facilities with an interdisciplinary team by using aesthetic visual products will promote the attention required to treat these issues through communication and encourage the provision of adequate assistance appropriate for each resident. The interdisciplinary products, including the sleep flowchart, user manual, and infographic, will be introduced and revealed within the following chapter.

## **Chapter IV**

### **Product**

The purpose of the flowchart, user manual, and infographic is to increase safety, task participation, and quality of life for older adults in LTC facilities by guiding staff through the sleep intervention process. The flowchart and user manual were organized using the tenets of the EHP model, which focused on the interaction between one's context and his or her personal variables. With OT supervision, the flowchart will allow LTC staff members, such as healthcare aids, to play a role in implementing evidenced-based sleep promotion interventions.

The user manual was created to provide further clarification of the flowchart, and the infographic was created to assist OTs with sleep intervention implementation. The flowchart is a 24-inch by 36-inch poster with graphics, text, and arrows to guide the selection and implementation of non-pharmaceutical sleep interventions. The user is guided to select the type of sleep disturbance being experienced by a resident, trouble getting to sleep, trouble staying asleep, or trouble with daytime sleepiness. Arrows from each type of sleep disturbance guide the user through evidence-based interventions to treat that specific issue. Unique icons were paired with each intervention and are uniform throughout the flowchart and user manual to improve the utility and simultaneous use of these products. The flowchart poster was designed to be aesthetically pleasing and is intended to be displayed in a high visibility position within the paraprofessionals working area, and the user manual is to be stored nearby. The infographic is meant to be displayed in the OTs' working area, but is not required to be visible to LTC residents or staff.



*Figure 1.* Sleep flowchart that provides visual reminders for OTs and paraprofessionals.

## IMPROVING OLDER ADULT SLEEP IN LONG TERM CARE FACILITIES FLOWCHART

A user manual for healthcare workers who are addressing sleep

### Flowchart manual index:

How to use the sleep flowchart...p.2  
 Trouble GETTING to Sleep.....p.4  
 Trouble STAYING Asleep.....p.5  
 Trouble with DAYTIME Sleepiness .p.13  
 Infographic for OT.....p.18  
 Sleep flowchart placement.....p.19  
 Sleeping assessments.....p.21  
 References.....p.22

Older adult residents may need help to sleep better. Everyone at a long-term care facility can play a part in helping residents sleep better.

### Poor sleep in older adults at long-term care facilities causes:

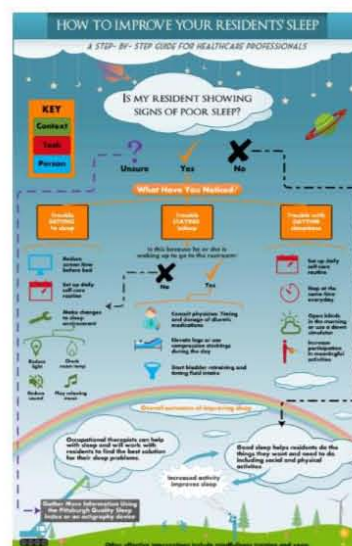
- Difficulty with everyday tasks
- Irritation
- Fewer conversations with peers
- Trouble learning new tasks
- Increased risk of falling
- Increased risk of death

*Resident Sleep is Everyone's concern*

*Occupational Therapists work with older adults having problems with sleep but it is nurse and health aids that have 70%-80% of the interactions.*

<sup>1</sup> (Paraprofessional Healthcare Institute, 2013)

This manual has been created to help health care workers who work in long term care facilities with older adult residents communicate with occupational therapists about the role everyone can provide to help with resident sleep.



## USING THE SLEEP FLOWCHART IN A LONG TERM CARE FACILITY

### What have you noticed?

*If the resident is restless in the evening, use the icons under Trouble GETTING to Sleep.*

Trouble  
GETTING  
To Sleep



*Follow the arrow under 'Yes' if the resident is waking up at night to go to the restroom. If the resident is not waking up to use the restroom, follow the arrow under 'No' and go to "Make changes to sleep environment".*



Trouble  
STAYING  
Asleep

*If the resident is sleepy, moody, or is not talking as much as normal, follow the arrow under 'Trouble with DAYTIME Sleepiness'.*

Trouble with  
DAYTIME  
Sleepiness

*To measure a resident's sleep who has trouble communicating, See page 8 for using an Actigraphy device.*

*or*

*To measure a resident's sleep who does not have trouble communicating, the Pittsburgh Sleep Quality Index can be used.*

?

Unsure



## How to use the sleep flowchart



Locate the key in the upper left corner of the sleep flowchart

**Context:** All of the icons with the green coloring are interventions that include the physical, or non-human environment.

**Context**

**Task:** All of the icons with the red coloring are interventions that include tasks for the resident to do to improve sleep. Ideally, people would be able to participate in an unlimited number of tasks, but a residents' tasks are limited by the environment of the long-term care facility.

**Task**

**Person:** All of the icons with blue coloring are interventions that are done to a person or resident, including changing that resident's behaviors.

**Person**

*Each person has their own unique behaviors, abilities and beliefs.*

**The goal of using this sleep flowchart is to increase the number of tasks that a resident can do, which promotes a higher self-esteem and better health.**

## Trouble GETTING To Sleep



**Reduce  
Screen Time  
Before Bed**

Screen time is how long a resident is looking at any screen that gives off light, including televisions, computers, or cell phones. The light from a screen will cue a resident's body to remain awake.

- Activities like watching TV in the evening can be replaced with reading a book, listening to relaxing music on the radio, or listening to a book on tape.
- Residents should be relaxing in the evening to prepare for sleep, so the activities you suggest for replacing screen time should have a relaxing theme.
- Be sure to ask a resident why they are using screen devices before bed, it may be something that the resident believes is important. It is the resident's choice.



Screen time at night





## Set up daily self-care routine

Daily routines are the order that tasks are done. Doing tasks at the same time everyday will tell the resident's body it is time to sleep or wake. For example, when residents brush their teeth and hair in the morning, it lets their bodies know it is time for waking. Modify nighttime tasks so that they are specific to the evening to signal that it is almost time for sleep.

- Dressing in clothes for the day, and different clothes to sleep, will help the resident know it is time for sleeping when the sleep clothes are put on.
- Cleaning dentures or hearing aids every night can be a cue for the resident to relax.
- Have the resident select relaxing music to play at the same time every evening.
- Be sure to ask the resident if there is any task that they like to do in the evening.



Daily routines promote sleep



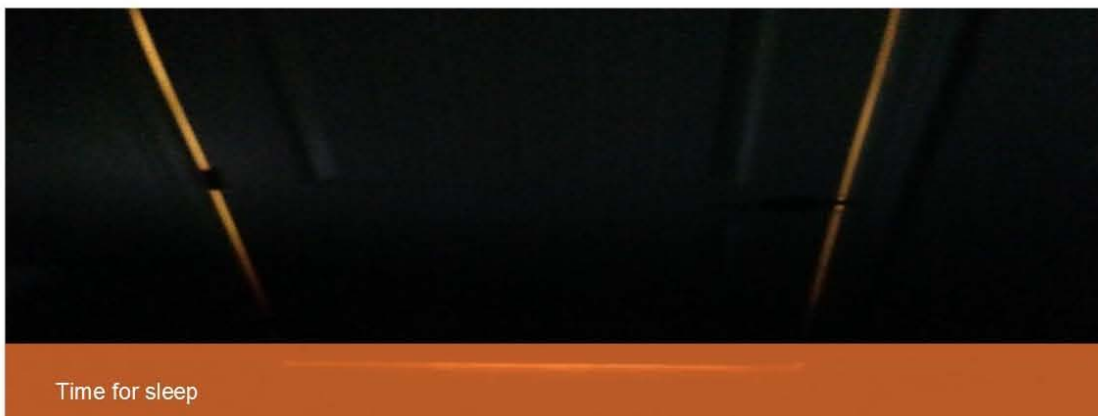
## Reduce Light

Light tells a resident's body to remain awake, so create a dark environment for sleeping.

- Draw the curtains.
- Turn off the TV and dim or shut off overhead lights.
- Reduce any bright light or glare from the hallway.
- Using eye masks, earplugs, and music should help residents sleep better when all three are used together.

### **Caution:**

- Light will be needed if a resident needs to get out of bed, such as when he or she is going to the restroom, so make sure there is enough lighting to be safe for the resident.
- An older adult's eyes take a longer time to adjust from dark light. Allow time for the resident's eyes to adjust before they attempt to stand, transfer, or walk.
- Be sure to ask residents if there is any reason why they prefer to keep lights on at night, darkness might scare a resident and not allow them to sleep.





**Check  
Room  
Temperature**

Residents will have an easy time sleeping when their hands and feet are warm and their core is cooler.

Things that may help:

- Set the thermometer lower at night
- Socks
- Gloves
- Warm blankets

This is especially true in the winter.

Cooler temperatures at night let a resident's body know that it is time for sleeping.



Cooler room temps at night



## Reduce Noise

Nighttime noise in long-term care facilities can be as loud as a hospital, residents may have difficulty sleeping through it.

- A room that has less hallway traffic might help a resident who cannot sleep because of noise.
- Turn down staff TVs and phone ringers if they are close to residents rooms.
- A resident may need to change rooms if a roommate snores, or wakes to void.
- Not all sounds are bad. Always ask or observe the resident to see what they think of sounds. The sound of a constant fan might be pleasant, but the noise of talking might be disturbing.





## **Play Relaxing Music**

Music at the same time every evening has been shown to help older adults relax and get to sleep.

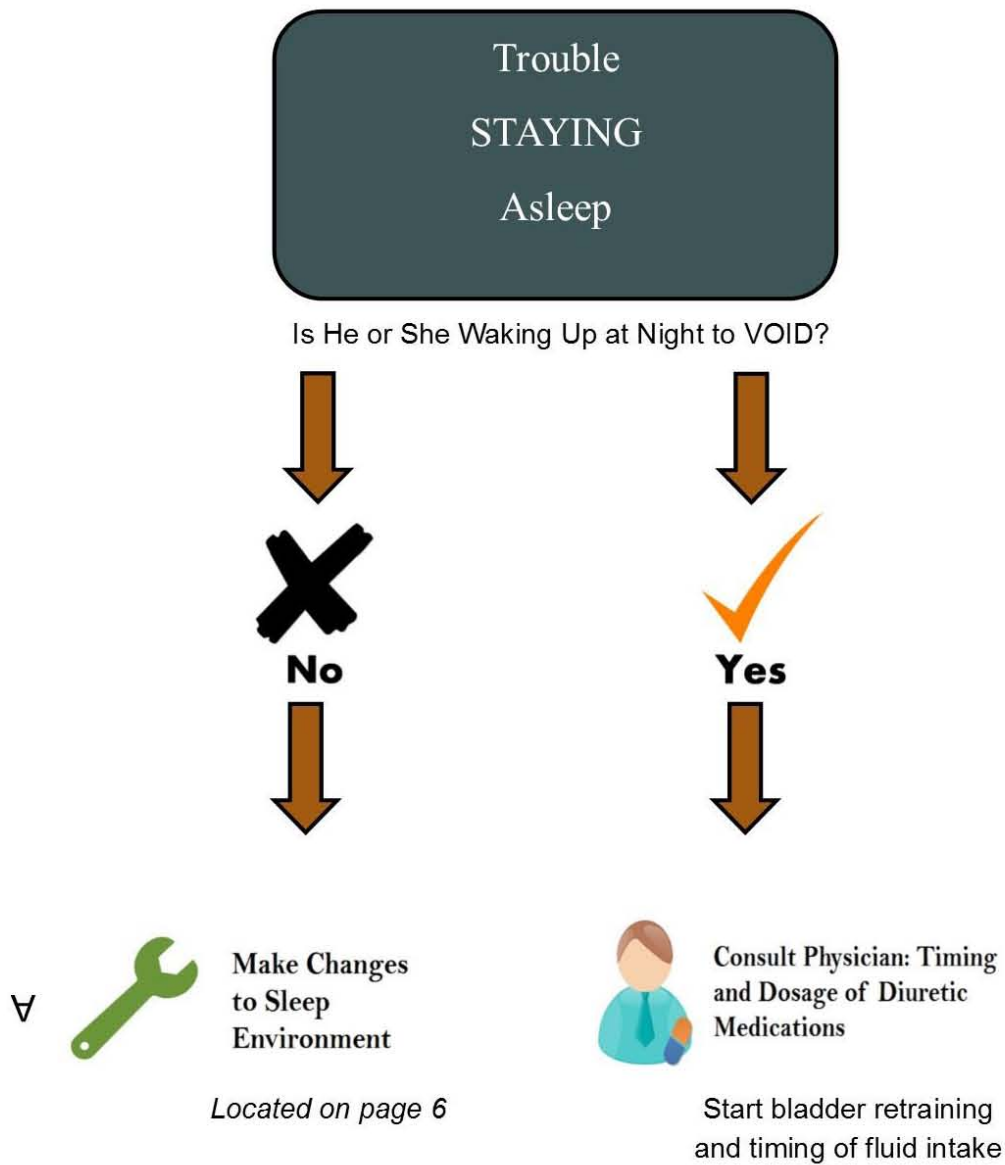
The music can be chosen by:

- The staff
- The resident

Music combined with eye masks and ear plugs also helps reduce distractions from other noises.



Music







## Start Bladder Retraining & Timing Fluid Intake

Drinks in the evening should be avoided. Also, an older adult might have a habit of waking to void that is hard to break.

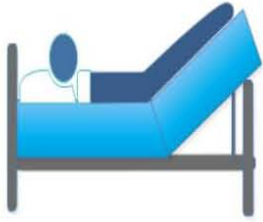
- Ensure a resident voids before going to sleep for the night.
- Ensure the resident voids when they wake in the morning, to break any habit of waking at night.
- Do not encourage drinking fluid in the evening.

### Caution:

- Make sure a resident is not dehydrated, have them drink plenty of fluids during the day.
- Check the color of the urine, dark urine may mean that the resident is dehydrated, which can lead to falls or confusion.
- Remember, only encourage a resident to drink less in the evening. Never withhold drinks if a resident is thirsty.



Avoid waking up to use the restroom at night



## Elevate legs or use compression stockings during the day

At night, fluid that may have settled in a resident's legs moves back up to the bladder, causing them to void.

- A resident who wears compression stockings on their feet and legs during the day will allow fluids to move throughout their body to help ensure that voiding does not wake the resident at night.
- Elevating a resident's legs during the day will move the fluids in his or her body in the daytime, and not at night when fluids naturally get processed causing a person to wake up.
- Schedule a naptime after lunch, at the same time everyday, to help the resident's body process fluid.
- Ask or observe how the resident feels about naps or the compression stockings.



Leg compression during the day reduces nighttime voiding



## Trouble with DAYTIME Sleepiness



### **Set up daily self-care routine**

The most important tasks to do at the same time everyday for improving sleep are the basic activities of daily living.

- Toileting
- Dressing
- Eating
- Walking to and from activities
- Caring for personal devices (dentures/hearing aids), combing hair/brushing teeth
- Sexual activities (if appropriate)



Daily routines promote sleep



## **Nap at the same time everyday**

### **Nap at the same time everyday**

- Napping has been shown to improve residents' learning ability.
- Short naps do not affect nighttime sleep.
- Limit a nap to 60-90 minutes.
- Daily routines are important to let the resident's body know when to sleep, so a nap at the same time every day is best.
- In some cultures napping is encouraged and is accepted as a normal daily routine. It is important to find out why a person is napping.



Nap at the same time every day



## **Open blinds in the morning or use a dawn simulator**

### Open blinds or use a dawn simulator

- Morning sunlight will cue a resident's body that it is time for being awake, so let sunlight enter the resident's room as much as possible.
- Dawn simulators are special lights that have a similar effect as sunlight. Position a resident in front of a dawn simulator to cue their body it is daytime.
- Caution:
- Glare in the room may make it difficult for a resident to see, increasing the risk of tripping and falls.
- An older adult's eyes take a long time to adjust to bright and dark light. Allow time for the resident's eyes to adjust before he or she attempts to stand, transfer, or walk.
- Altering a resident's environment by moving to an east-facing room may offer more light in the morning.



Sunrise



### Participation in meaningful activities

- More activity throughout the day helps the resident's body know that it is day time and time to be awake.
- If the activity is meaningful to the resident he or she will be more willing to participate in the activity.
- Meaningful activities are often social, even if this does not involve talking.
- Occupational therapists are the best resource for meaningful activities in long term care facilities.



# Actigraphy

**Actigraphy** devices measure movement to see how long a resident is asleep. These devices make it easy to figure out a resident's sleep patterns, and you do not have to rely on the resident to tell you about his or her sleep quality.

- Actigraphy devices are commonly worn on the wrist of the resident's dominant hand.
- The devices record nighttime sleep and daytime activity, and can be worn for days in a row.
- The devices measure the movement of the arm that the unit is worn on .
- Actigraphy devices have been approved by sleep experts to measure sleep.
- The devices can be linked or wired to a computer to download the sleep records, and can give minute-by-minute recordings of sleep disturbances.
- The resident's sleep behaviors can be compared from one night to the next.



Actigraphy unit sample



# [ Pittsburgh Sleep Quality Index ]

**The Pittsburgh Sleep Quality Index (PSQI)** is an easy-to-use sleep assessment that does not require any formal training. The PSQI has been found to be reliable with older adults who do not have trouble communicating.

- PSQI takes 5-10 minutes to complete.
- PSQI uses 19 self-rated items that relate to 7 sleep measurements.
- PSQI asks questions about sleep during the past month.

PSQI measures:

1. The resident's overall sleep quality
2. How long it takes the resident to fall asleep
3. How long the resident slept
4. How difficult it is to sleep
5. How often the resident wakes up
6. Use of sleeping medication
7. If daytime tasks are harder because of the resident's lack of sleep

(Littner et al., 2003)



The infographic insert was written for occupational therapists to use evidence-based interventions and provide further elaboration on the established interventions. The Ecology of Human Performance model guided the production of this flowchart, and the interventions are organized according to the model's intervention types.

**Establish/Restore** interventions are used when an occupational therapist is directing a resident to learn new skills (establish) or relearn (restore) a skill that has been lost.

**Adapt/Modify** interventions are used when contextual factors of an older adult are changed in order to increase the individual's performance range. Adapting an activity occurs when the activity is graded for a resident. A modification takes place when something in the context is changed.

**Alter** interventions are used when the entire context is changed to increase a resident's performance range.

**Prevent** interventions are used to stop further decreases in participation and performance ranges of the older adult resident.



## USING THE SLEEP FLOWCHART IN A LONG TERM CARE FACILITY

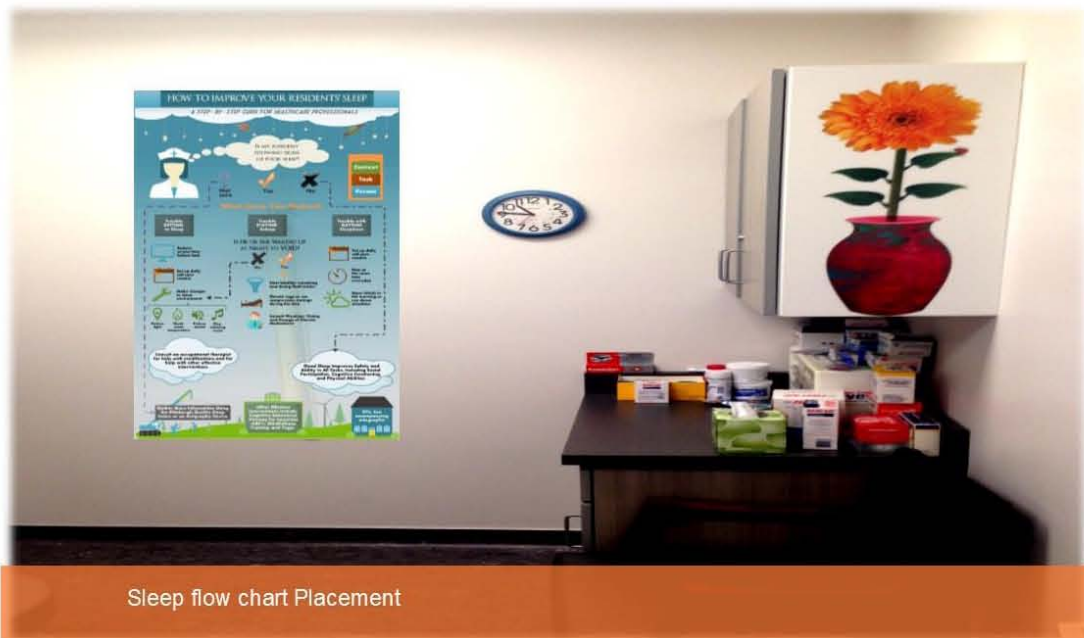
### Placement options:

- Nurses stations
- Breakrooms
- Resident hallways
- Shared office space

### Sleep flowchart placement

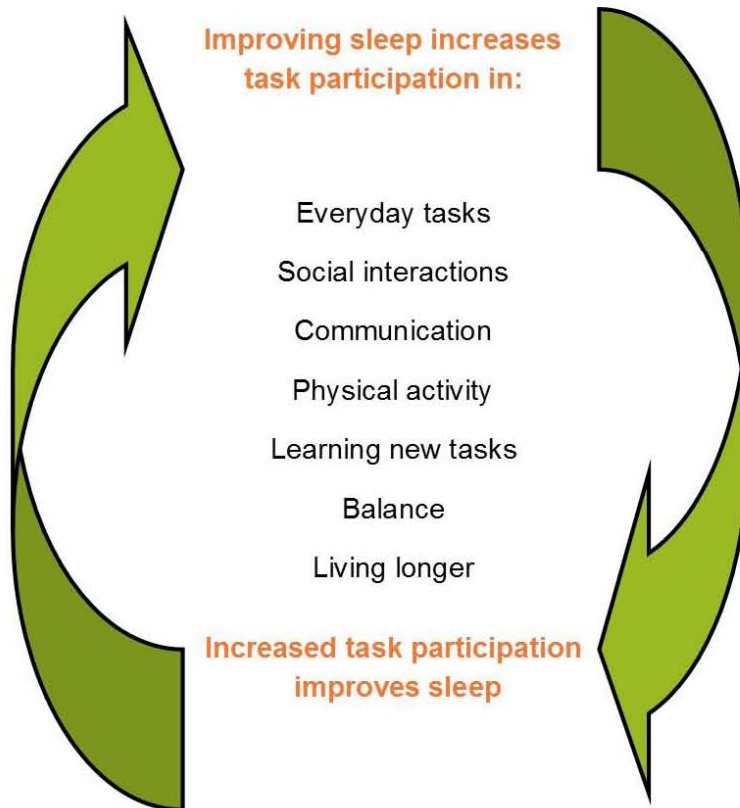
Keep the flowchart visible

- Hang it up in locations where healthcare workers pass frequently during their shifts
- Display at eye level
- Keep the flowchart near a copy of the user manual
- Keep the infographic in areas where OTs frequent





## USING THE SLEEP FLOWCHART IN A LONG TERM CARE FACILITY



***Older adult residents may lose their ability to help themselves sleep better. Everyone at a long-term care facility can help their residents sleep better.***

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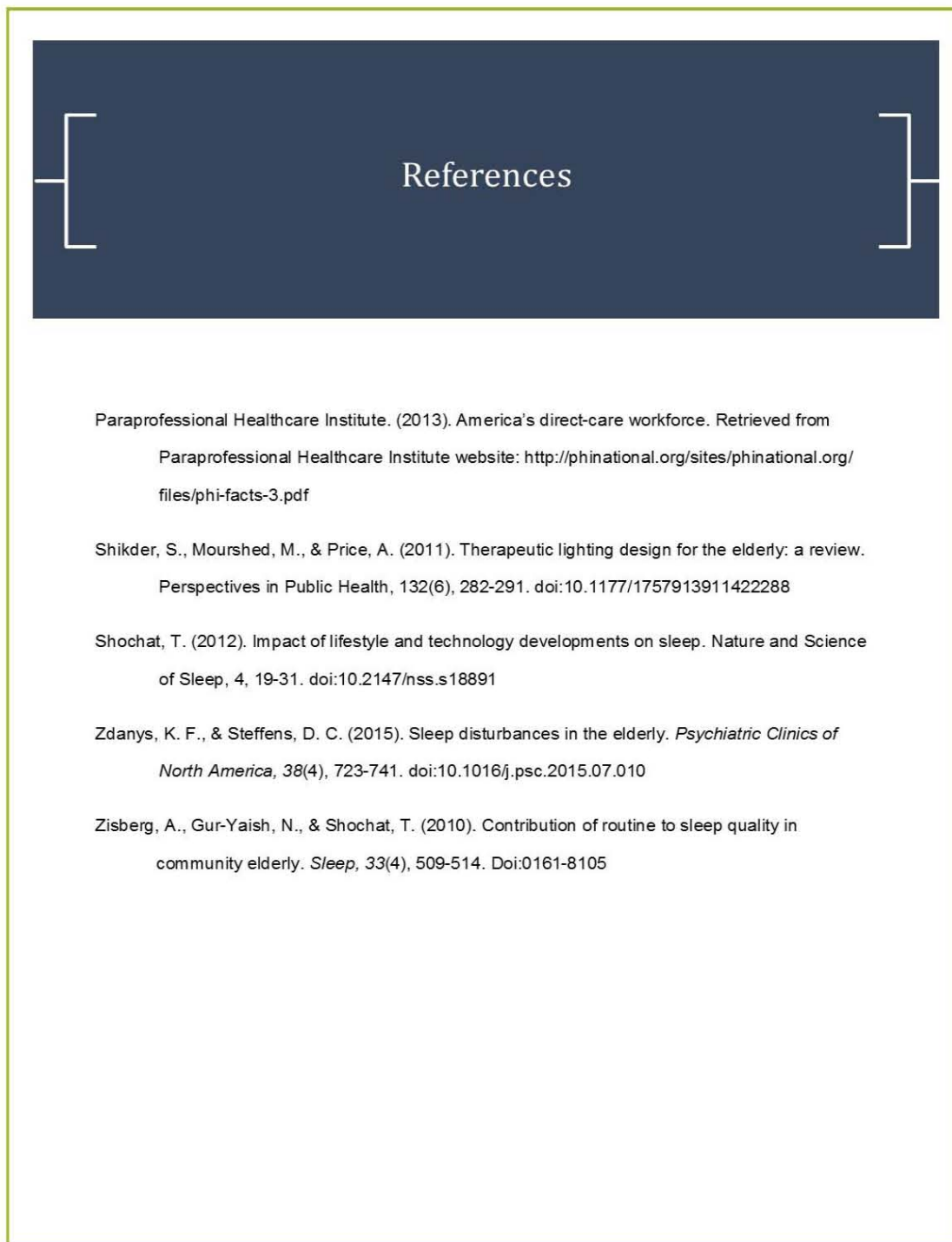


Figure 2. User manual that provides directions and supplemental information for sleep flowchart displayed in figure 1

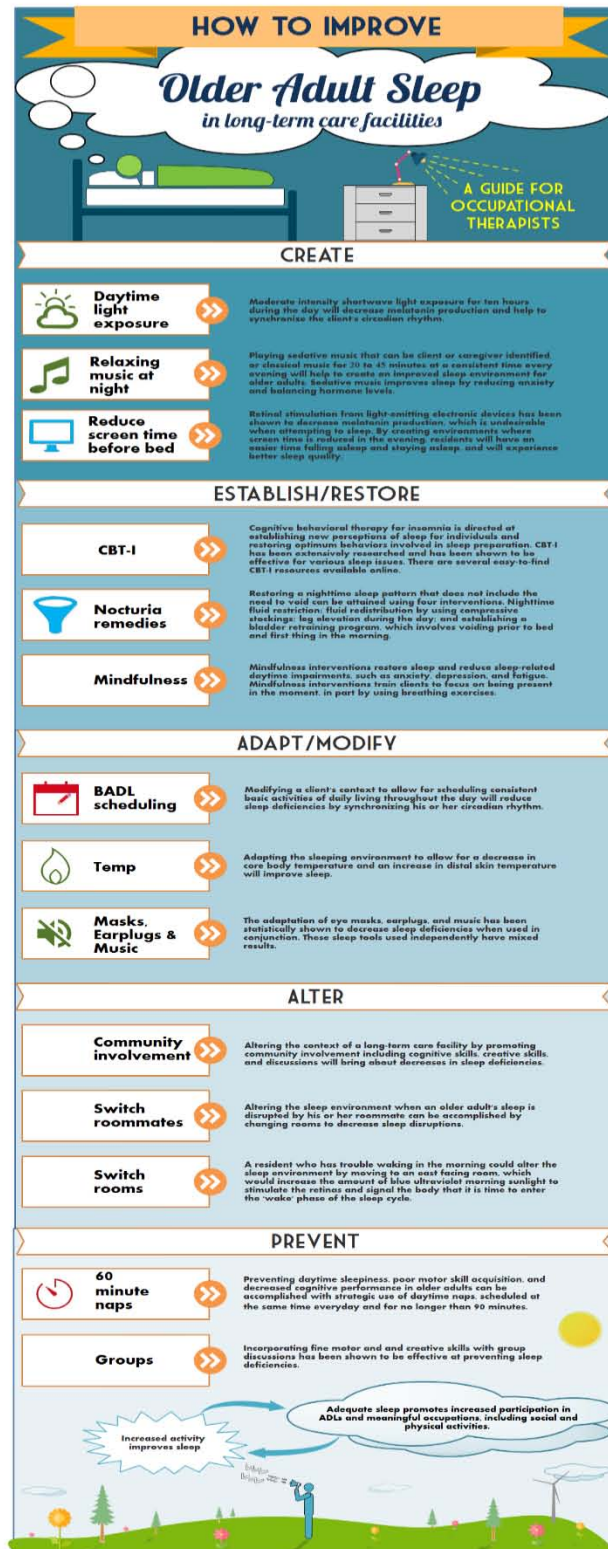


Figure 3. Infographic with specific intervention instruction to further guide OT.

**Flowchart use.** Through the visibility of the flowchart poster, OTs, paraprofessionals, and other healthcare workers can be reminded of the significant role that sleep plays in the quality of LTC residents' lives. The infographic provides OTs with intervention ideas that are categorized according to the EHP model, categorizations that are familiar to OTs due to their adoption into the AOTA Framework third edition (AOTA, 2014). The sleep flowchart and infographic are supported by the evidenced-based research presented in Chapter 2 of this document. Each intervention proposed in the flowchart and infographic are cited in the user manual, to enable healthcare workers to seek out research for specific interventions. The sleep flowchart will require an implementation procedure to become utilized by LTC facilities.

Chapter five of this document will outline the limitations of the sleep flowchart and supporting documents. Additionally, the process for implementation will be addressed to simplify future use. A summary of overall findings from the sleep flowchart project and the potential for further scholarly collaboration will also be considered in the concluding chapter.

## **Chapter V**

### **Sleep Flowchart Discussion**

The sleep flowchart was created to highlight the application of OT principles to improve older adults' sleep at LTC facilities through OT, paraprofessional, and healthcare worker collaboration. The authors of the sleep flowchart utilized the EHP model's (Dunn et al. 1994) intervention types to organize all phases of creation, including the literature review and construction of the flowchart, infographic and user manual. Leland et al. (2014) performed a scoping review of OT sleep intervention literature that served to guide the sleep flowchart literature review.

To facilitate collaboration between OTs and LTC healthcare workers, the sleep flowchart was designed at a ninth-grade Flesch-Kincaid reading level, with accompanying simple icon representations to further aid comprehension. The supplemental infographic was created in conjunction with the flowchart to give OTs further sleep intervention information, which was also organized according to the intervention types used with the EHP model (Dunn et al, 1994). A supplementary user manual was produced to provide explicit instructions and additional clarification for using the flowchart and infographic. These products will foster interdisciplinary collaboration to promote healthy sleep amongst older adults at LTC facilities. Interdisciplinary collaboration efforts are necessary for ensuring that paraprofessional aids are able to correctly implement sleep interventions, as aids spend a considerable amount of time with the older adult residents. Having been incorporated into the AOTA Framework in 2008, sleep participation is considered an emerging field of study within the OT profession, and further research is needed to develop an adequate literature base (Leland et al., 2014).



## **Limitations**

The limitations of the sleep flowchart materials include a scarcity of OT-specific sleep preparation and sleep participation literature (Leland et al., 2014), the widespread occupational deprivation occurring with residents at LTC facilities (Garms-Homolova et al., 2010), and barriers to interdisciplinary collaboration resulting from the scheduling difficulties that arise from 24-hour staffing at LTC facilities. The extent to which poor sleep hinders daily occupations, including physical and cognitive capabilities, also remains unclear (Garms-Homolova et al., 2010). Leland et al. (2014) recognized the lack of evidenced-based sleep interventions for OTs, a limitation that was further compounded by the lack of research specific to older adults within LTC facilities.

To combat the scarcity of OT-specific literature, published evidence from outside of the field of OT was included in the literature review if it fell within with the OT scope of practice.

Widespread occupational deprivation was discovered by Garms-Homolova et al. (2010) in older adult LTC facilities. The authors concluded that there was a bidirectional relationship with sleep deficiencies and deficiencies in the occupations of social participation, IADLs and leisure activities; thus, creating further deficits in sleep and decreasing functional performance in these occupations. To remedy these problems, interdisciplinary education and training sessions with OTs, paraprofessionals and other LTC healthcare staff must occur to facilitate proper use of the sleep flowchart and to promote collaboration. Multiple sessions will be required for educating staff on use of the sleep flowchart and delivering interventions due to the varying work shifts at 24-hour care facilities. A protocol for education sessions has not yet been created, which may result in inconsistent training and use of the flowchart.

## **Implementation**

Occupational therapy conferences and events are being considered for presenting the sleep flowchart, including the Montana Occupational Therapy Association and the Wyoming Occupational Therapy Association. Additionally, the sleep flowchart may be introduced to regional LTC facilities with geographical proximity to Montana and Wyoming. The authors may offer free continuing education to paraprofessionals, and education for OTs to include recent research findings regarding sleep and the implementation of the sleep flowchart. The authors anticipate that educating LTC staff members and decision makers will promote an interest in improving residents' sleep through use of the sleep flowchart and supporting products.

## **Discussion**

The older adult population in the United States is experiencing steady growth, and over half of this population present with sleep deficiencies (Ortman et al., 2014; Mather, 2016). Sleep deficiencies are exacerbated by the loss of functional abilities in some LTC residents, including losing the ability to structure their daily and nightly routines (Ancoli-Israle et al., 2011; Ohayon, 2008). Addressing older adult sleep in LTC facilities requires collaboration among OTs trained in sleep interventions, including further engagement in daily occupations; and paraprofessionals who lack formal training but provide support for older adults at all hours of the day. This interdisciplinary approach for improving older adult sleep is necessary within LTC facilities to facilitate reductions of sleep deficits and to facilitate increases in the quality of life for older adult LTC residents.

## **Future Research**

The sleep flowchart and supporting materials provide visual cues to remind staff of the need to address sleep, and provide easy-to-understand interventions; however, additional

research is required to measure the flowchart's effectiveness in two distinct ways. First, will implementation of the sleep flowchart promote a culture that views poor sleep as a considerable problem that should be addressed by altering contextual factors within the LTC facility? If staff and decision makers begin to recognize the importance of residents' sleep, it may lead to the acknowledgement that additional resources are needed to effectively address sleep. Second, does the sleep flowchart and supporting documents help to develop interdisciplinary collaboration for addressing sleep deficits in older adults in LTC facilities? There may be more effective methods to promote an interdisciplinary approach in which sleep deficits are given the necessary attention on a routine basis.

It is widely accepted that staff at LTC facilities in the United States largely focus upon identifying and treating older adults who require assistance with ambulation, feeding, toileting, dressing, communication, and cognitive functioning. Based upon the prevalence of sleep deficiencies amongst older adults and the resulting issues, it becomes paramount to also identify those who are quietly calling out for assistance with sleep participation and preparation, but whose calls go unanswered. This lack of attention toward residents' sleep, which plays an intricate role in supporting all other occupations, is not due to a shortage of available sleep interventions; but due to underutilization of paraprofessionals, staffing shortages, and poor understanding of effective methods to improve sleep. The sleep flowchart and supporting materials are the first step in addressing the concerns of sleep deficiencies of older adults in LTC facilities.

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